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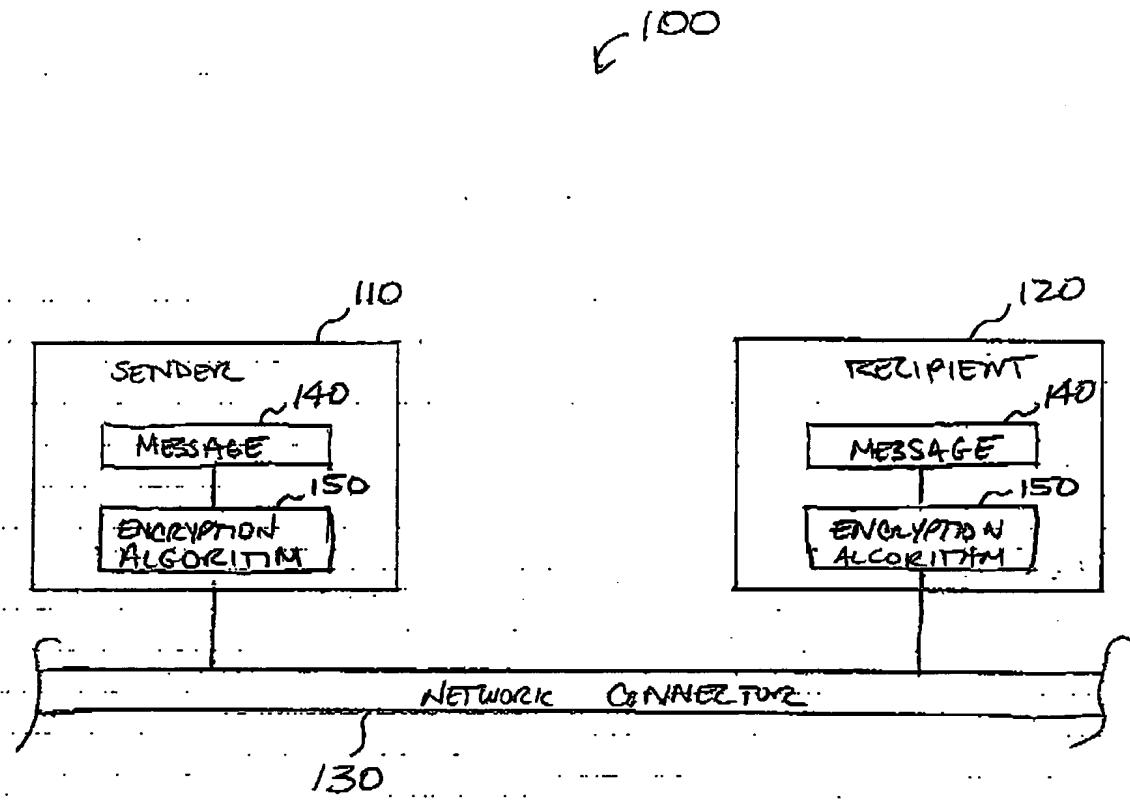


FIG. 1A (PRIOR ART)

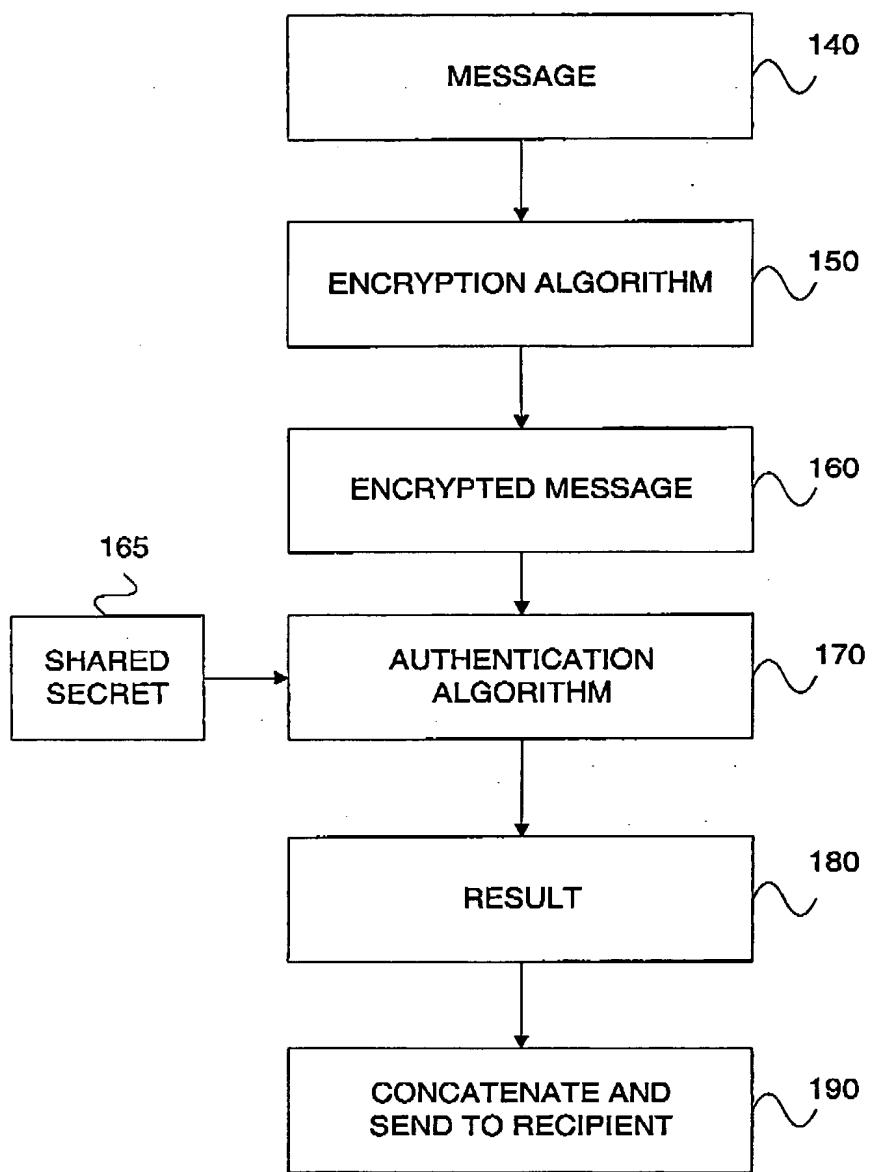


FIG. 1B

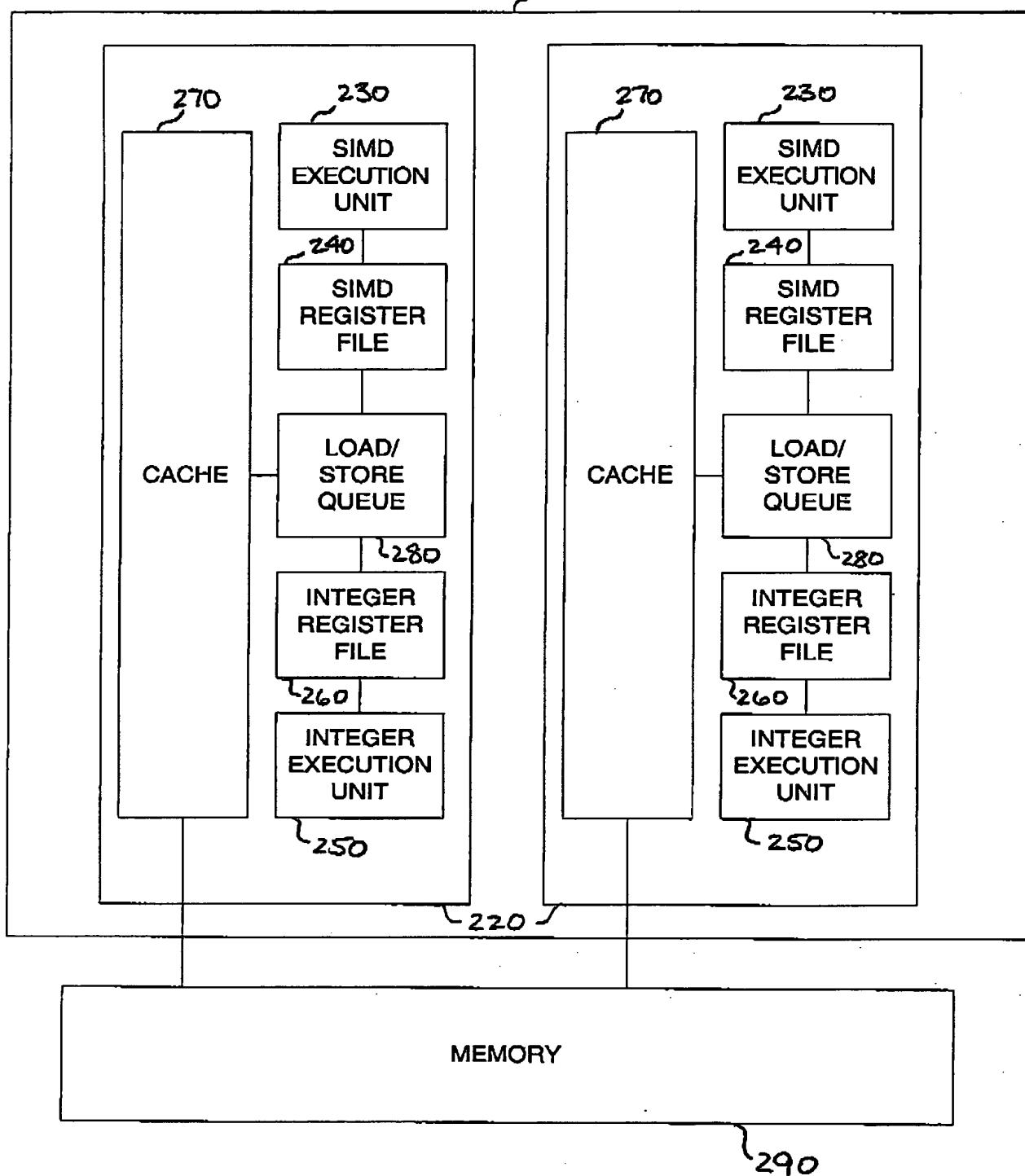


FIG. 2

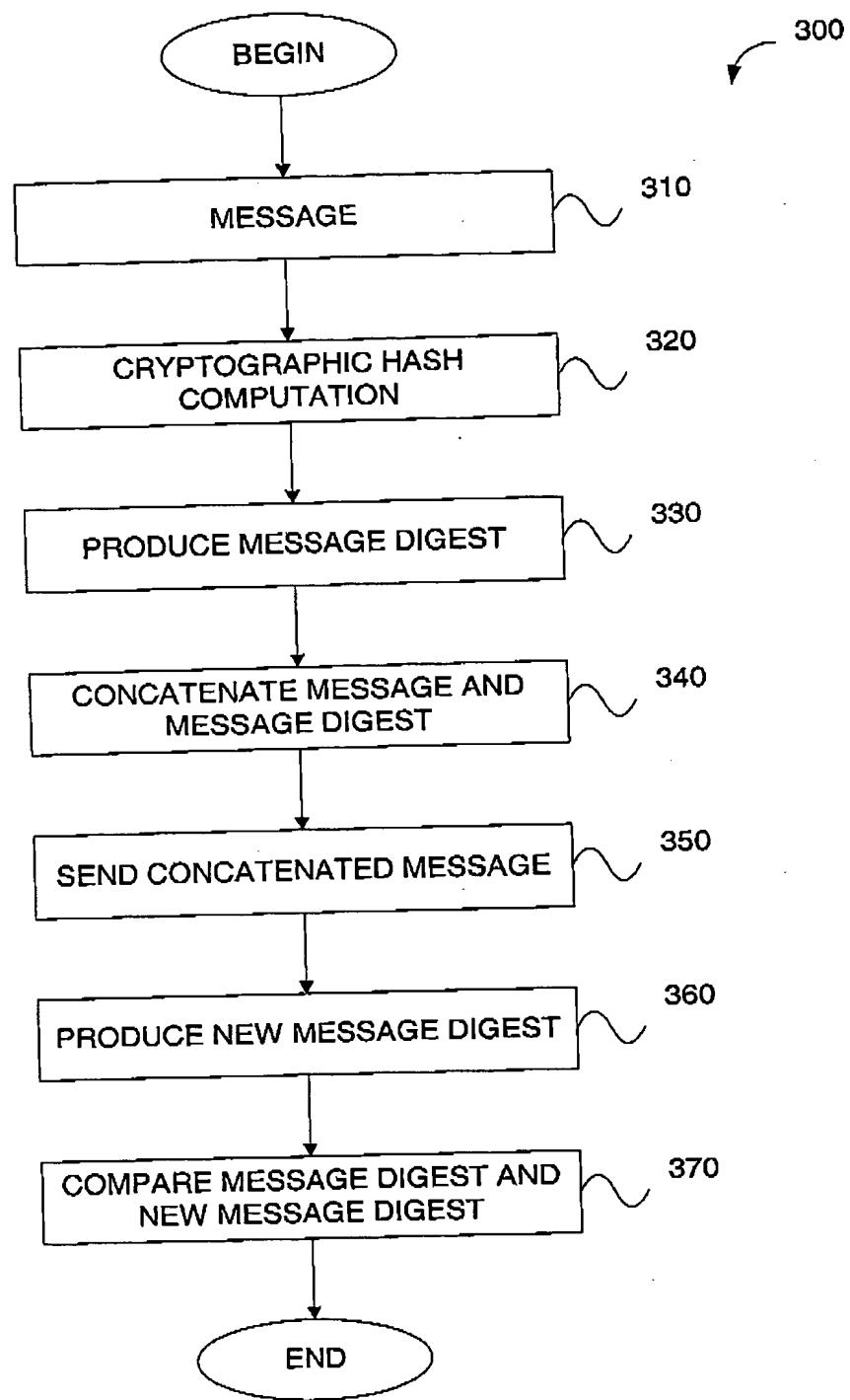


FIG. 3

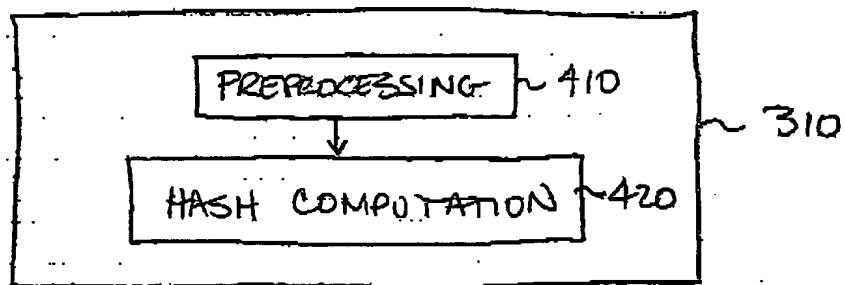


FIG. 4

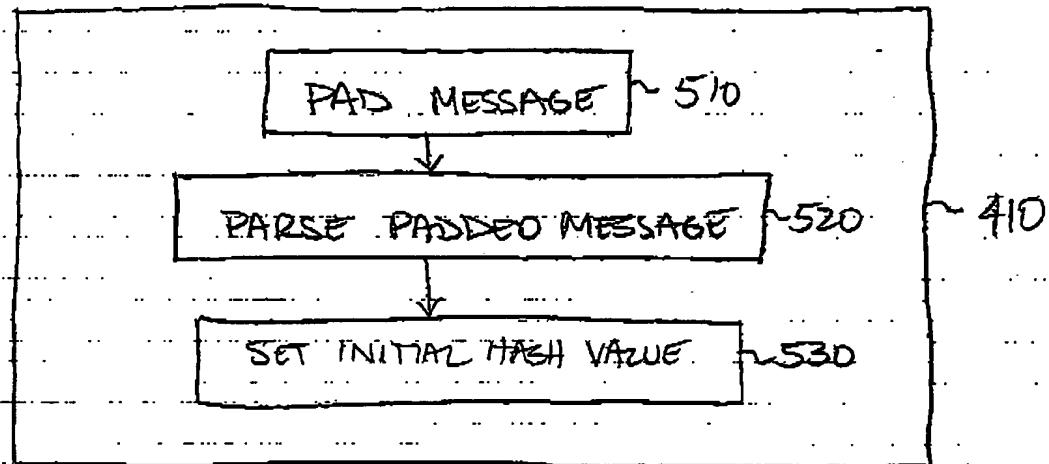


FIG. 5

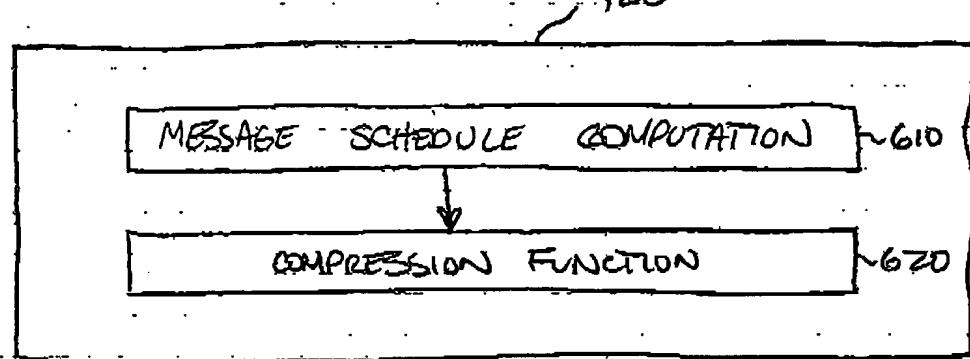


FIG. 6

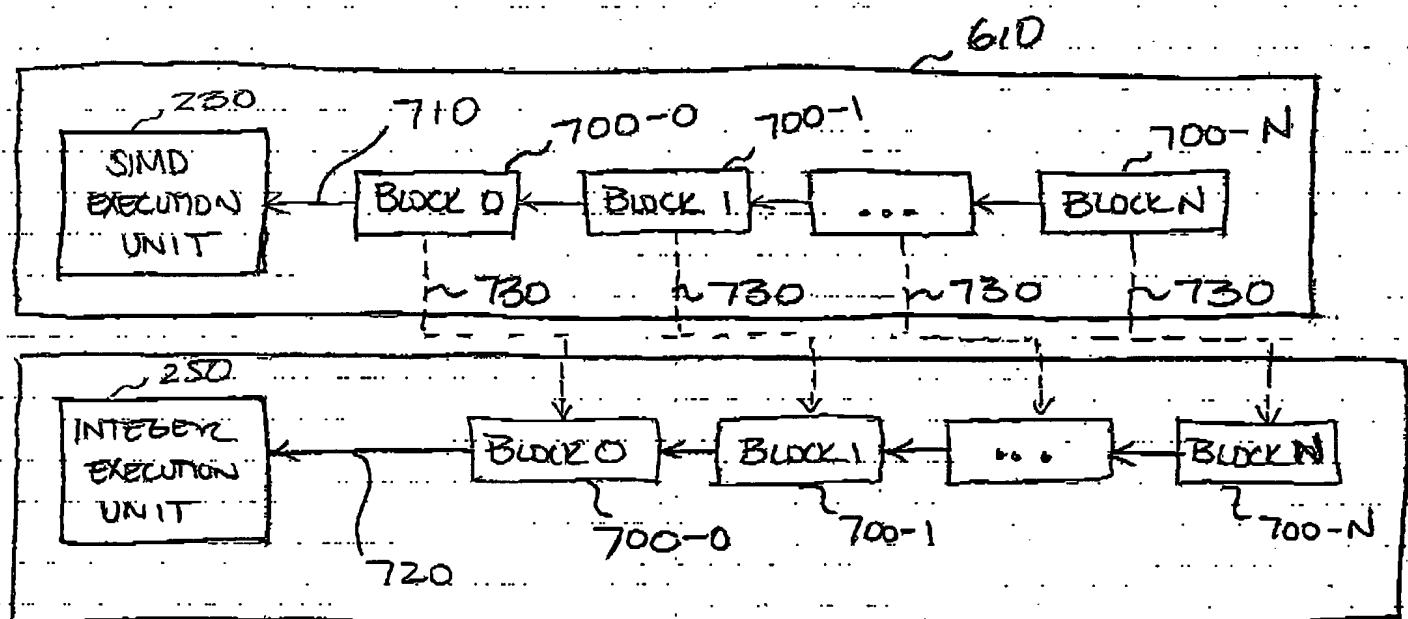


FIG. 7

800

```

Wj = Mj for j = 0 to 15
for j = 16 to 79
{
    Wj = Rotl1(Wj-3 ⊕ Wj-8 ⊕ Wj-14 ⊕ Wj-16)
}

```

FIG. 8A

850

```

for j = 0 to 79
{
    T = rotl5(a) + fj(b,c,d) + e + kj + wj
    e = d
    d = c
    c = rotl30(b)
    b = a
    a = T
}

```

where:

$$\begin{aligned}
 fj(x, y, z) &= (x \& y) \oplus (\sim x \& z) \\
 &= x \oplus y \oplus z \\
 &= (x \& y) \oplus (x \& z) \oplus (y \& z) \\
 &= x \oplus y \oplus z
 \end{aligned}$$

```

for j = 0 to 19
for j = 20 to 39
for j = 40 to 59
for j = 60 to 79

```

$$\begin{aligned}
 kj &= 0x5a827999 \\
 &= 0x6ed9eba1 \\
 &= 0x8f1bbcdcc \\
 &= 0xca62c1d6
 \end{aligned}$$

```

for j = 0 to 19
for j = 19 to 39
for j = 40 to 59
for j = 60 to 79

```

FIG. 8B

900

```
Wj = Mj for for j = 0 to 15
for j = 16 to 63
{
    Wj = S1 (Wj-2) + Wj-7 + S0 (Wj-15) + Wj-16
}
```

where:

$$\begin{aligned} S0(x) &= \text{Rotr7}(x) \wedge \text{Rotr18}(x) \wedge \text{Shr3}(x) \\ S1(x) &= \text{Rotr17}(x) \wedge \text{Rotr19}(x) \wedge \text{Shr10}(x) \end{aligned}$$

FIG. 9A

950

```
for j = 0 to 63
{
    T1 = h + sig1(e) + ch(e,f,g) + kj + Wj
    T2 = sig0(a) + maj(a,b,c)
    h = g
    g = f
    f = e
    e = d + T1
    d = c
    c = b
    b = a
    a = T1 + T2
}
```

where:

$$\begin{aligned} \text{sig0}(e) &= \text{rotr2}(e) \oplus \text{rotr13}(e) \oplus \text{rotr22}(e) \\ \text{sig1}(a) &= \text{rotr6}(a) \oplus \text{rotr11}(a) \oplus \text{rotr25}(a) \\ \text{ch}(e,f,g) &= (e \& f) \oplus (\neg e \& g) \\ \text{maj}(a,b,c) &= (a \& b) \oplus (a \& c) \oplus (b \& c) \end{aligned}$$

FIG. 9B

1000

```

Wj = mj for j = 0 to 15
for j = 16 to 79
{
  Wj = gamma1(Wj-2) + Wj-7 + gamma0(tj-15) + Wj-16
}

```

where:

$$\begin{aligned}
 \text{gamma0}(x) &= \text{rotr1}(x) \oplus \text{rotr8}(x) \oplus \text{shr7}(x) \\
 \text{gamma1}(x) &= \text{rotr19}(x) \oplus \text{rotr61}(x) \oplus \text{shr6}(x)
 \end{aligned}$$

FIG. 10A

1050

```

for j = 0 to 79
{
  T1 = h + sig1(e) + ch(e,f,g) + kj + wj
  T2 = sig0(a) + maj(a,b,c)
  h = g
  g = f
  f = e
  e = d + T1
  d = c
  c = b
  b = a
  a = T1 + T2
}

```

where:

$$\begin{aligned}
 \text{sig0}(e) &= \text{rotr28}(e) \oplus \text{rotr34}(e) \oplus \text{rotr39}(e) \\
 \text{sig1}(a) &= \text{rotr14}(a) \oplus \text{rotr18}(a) \oplus \text{rotr41}(a) \\
 \text{ch}(e,f,g) &= (e \& f) \oplus (\sim e \& g) \\
 \text{maj}(a,b,c) &= (a \& b) \oplus (a \& c) \oplus (b \& c)
 \end{aligned}$$

FIG. 10B